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M E M O R A N D U M

DATE: December 12, 2000

TO: Metropolitan King County Councilmembers

FROM: Don Eklund, County Auditor

SUBJECT: Management Audit: Scale Operator Injury Claims

Attached for your review is the management audit report of Scale Operator Injury Claims. The audit objective was to review scale operator injury claims and determine the effectiveness of the Solid Waste Division and the Safety and Claims Management Program in responding to the reported injuries.

The general conclusion of the audit was that the response of the Solid Waste Division and the Safety and Claims Management Program to the series of repetitive motion injuries among the scale operators was not timely or preventive. The audit also found that the Solid Waste Division did not have an effective process for prioritizing work order requests and as a result, took an unacceptably long time to act on simple work order requests involving ergonomic or safety issues.

The Executive's response to specific audit findings and recommendations is incorporated into the body of the report and the entire response is included in the appendix. The response indicates general concurrence with the audit recommendations and includes a timeline for implementing many of the recommendations.

We would like to thank the staff of the Solid Waste Division and the Safety and Claims Management Program for their cooperation during the audit process.

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MANAGEMENT AUDIT

SCALE OPERATOR INJURY CLAIMS

Presented to
the Metropolitan King County Council
by the
County Auditor's Office

Don Eklund, King County Auditor
Nancy McDaniel, Management Auditor
Paul Walker, CPA, CIA, Financial Auditor

Report No. 2000-07

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Abbreviations

ESAB	Employee Safety Advisory Board
L&I	Washington State Department of Labor and Industries
RCW	Revised Code of Washington

REPORT SUMMARY

Introduction

The management audit of scale operator injury claims was requested by the Metropolitan King County Council and was prompted by concerns over a series of repetitive motion injuries among Solid Waste Division scale operators. The audit objective was to review scale operator injury claims and determine the effectiveness of the Solid Waste Division and Safety and Claims Management in responding to the injuries.

Background

Repetitive motion injuries develop gradually as a result of repeated microtrauma to soft tissue such as tendons, ligaments, and nerves. Many jobs associated with these injuries involve performing simple repetitive tasks such as gripping or pushing. Major ergonomic risk factors include force, repetition, awkward postures, and insufficient recovery time.

The Solid Waste Division operates scale houses at the Cedar Hills landfill and nine transfer stations, which are staffed by 37 scale operators. From 1993 through 1998, 16 scale operators reported 23 repetitive motion injuries. As of May of this year, $254,533 had been paid out on these injuries for medical bills and time lost from work. The main factor listed for the injuries was opening and closing the sliding glass doors or windows used for customer access. In 1998 the Solid Waste Division replaced the manual sliding doors with push-button automatic doors. Since then, only one repetitive motion injury has been reported.

General Conclusions

The audit concluded that the response of the Solid Waste Division and Safety and Claims Management to the series of repetitive motion injuries among the scale house operators was not timely or preventive. In addition, Solid Waste did not have an effective process for prioritizing work order requests from employees and as a result, took an unacceptably long time to act on simple work requests involving ergonomic or safety issues.

FINDINGS AND MAJOR RECOMMENDATIONS

Finding 1 (Page 5)

The response of the Solid Waste Division and Safety and Claims Management to the series of repetitive motion injuries among the scale operators was not timely or preventative.

After the first two repetitive motion injuries were reported, Safety and Claims conducted ergonomic training for the scale operators, but it was not until two more injuries were reported that Safety and Claims evaluated the ergonomic risk factors at the scale houses. When they measured the amount of force needed to pull open the sliding glass doors, there were significant discrepancies between the measurements recorded by different staff. Although some measurements indicated pull forces that were near the limit of acceptable force for an average woman (84 percent of the scale operators are women), Safety and Claims did not follow up on the discrepancies to determine if the forces were indeed near the limit of acceptable force.

Safety and Claims recommended some physical changes to the scale houses, which are generally preferred over administrative controls (e.g., employee training) for ergonomic hazards. However, most of their recommendations emphasized employee training. Moreover, Solid Waste delayed or did not act on the physical changes that Safety and Claims did recommend. Solid Waste delayed installing large bar handles on the sliding glass doors and never implemented other recommendations that would have reduced the weight of the doors, such as replacing double panes with single pane glass. Safety and Claims continued to recommend training until 1998, when automated doors were installed at the direction of the County Executive.

Since then, only one repetitive motion injury has been reported by the scale operators (see Finding 4). The cost of the doors averaged just over $4,100 per site. Based on the number and cost of the repetitive motion claims, the doors paid for themselves in the first four and a half months they were installed.

The audit recommended that Safety and Claims develop a proactive approach for responding to clusters of repetitive motion injuries, including use of a case management system.

Finding 2 (Page 19)

The Solid Waste Division did not have an effective process for prioritizing work order requests from employees and as a result, took an unacceptably long time to act on simple requests that involved ergonomic and safety issues.

Solid Waste took a long time to act on repair requests from scale operators, even simple repairs related to ergonomic or safety issues that should have been prioritized. For example, it took one year to fix an awkward, stiff button that activated the automated door at one scale house; nine months to lower a wooden platform where a scale operator stood at the customer access window; and six months to install a vertical bar handle so the scale operator could use both hands to open the sliding door.

The audit recommended that Solid Waste Division management revise its system for requesting maintenance or repairs to ensure a timely, responsive process that prioritizes work order requests based on safety concerns.

Finding 3 (Page 22)

Repetitive reaching out the doors or windows for customer transactions may be a potential ergonomic issue.

By automating the sliding doors and windows, Solid Waste eliminated force as an element of the scale operators' job. The only repetitive motion injury since then was reported in May 2000, and was attributed to repetitive reaching out the windows to customers. Problems with reaching could indicate posture as a potential risk factor. The constant volume of customers at the transfer stations between 1992 and 1999 indicated that repetitive reaching would continue to be a part of the job unless Solid Waste moved to more self-service through increased use of credit cards by customers.

The scale operators work shifts of seven consecutive ten-hour days followed by seven days off. According to ergonomists interviewed by audit staff, this schedule did not allow sufficient recovery time, and even a week off would not be enough to recover from the microtraumas sustained over a week. Most scale operators, however, saw the work schedule as a major benefit of the job and did not want it changed.

The audit recommended that in the event of future clusters of repetitive motion injuries, Solid Waste Division management and Safety and Claims: 1) consider contracting with an ergonomics specialist for evaluations of the scale houses; and 2) review the scale operators' work schedule for possible revision in future contract negotiations.

Finding 4 (Page 26)

Solid Waste Division management included the scale operators in designing new scale houses.

At the time of the audit the Solid Waste Division was planning to replace some older scale houses. Management had involved scale operators in the design of the new buildings and incorporated their ideas into the plans. Some of the ergonomic features included automated windows instead of doors; lower windows for easier access to customers; and automatic adjustable workstations. This cooperative process should result in more ergonomic features built into the scale houses.

The audit recommended that Solid Waste Division management continue to build communication with the scale operators through the cooperative design process.

AUDITOR'S MANDATE

Scale operators' injury claims were reviewed by the County Auditor's Office pursuant to Section 250 of the King County Home Rule Charter and Chapter 2.20 of the King County Code. The audit was performed in accordance with generally accepted government auditing standards, with the exception of an external quality control review.

1 INTRODUCTION

Background

The management audit of scale operator injury claims was requested by the Metropolitan King County Council and included in the 2000 Auditor's Office work program. The audit was prompted by council concerns over the number of repetitive motion injuries occurring among transfer station scale operators in the Solid Waste Division, Department of Natural Resources.

Audit Objective and Scope

The objective of the audit was to review scale operator injury claims and determine the effectiveness of the Solid Waste Division and the Safety and Claims Management Program in responding to the reported injuries.

The audit reviewed the response by the Solid Waste Division and Safety and Claims Management to identify and correct factors contributing to the injuries occurring among Solid Waste Division scale operators. The audit was limited to a review of ergonomic injuries that were filed as workers' compensation claims between 1991 and May 2000. Ergonomic injuries were defined as repetitive motion or overexertion injuries that were not due to an accident or sudden trauma. The audit did not evaluate the process for managing workers' compensation claims.

Audit Methodology

The audit reviewed Safety and Claims Management records for all Solid Waste Division injury claims from 1991 through May 2000. Because no repetitive motion injuries were reported by scale operators before 1993, the audit focused on injuries reported in 1993 and later. Audit staff interviewed personnel from Safety and Claims Management, the Solid Waste Division, and Washington State Labor and Industries, as well as two ergonomists. Audit staff reviewed Solid Waste Division

maintenance records and scale operator logs to determine scale house repairs. In addition, audit staff visited all of the scale houses and interviewed a cross-section of scale operators. Audit staff also researched literature on ergonomic issues and repetitive motion injuries. A bibliography is included at the end of this report.

2 FINDINGS AND RECOMMENDATIONS

Background

The Solid Waste Division in the Department of Natural Resources operates scale houses at the Cedar Hills regional landfill and nine transfer stations throughout the county.[1] The ten scale houses were staffed by 37 full and part-time scale operators in 1999. The scale operators are represented by Service Employees International Union Local 6. They work shifts of seven consecutive ten-hour days followed by seven days off.

A major duty of the scale operators at the transfer stations is functioning as cashiers to customers hauling waste.[2] Access to customers is through sliding glass doors or windows. Three of the scale houses were built within the last ten years and are fairly large and modern. Most, however, are old, small shacks.

The Safety and Claims Management Program is organizationally located in the Office of Human Resources Management. It is made up of three sections: Safety and Health, which is responsible for administering King County's safety program to reduce or eliminate workplace accidents and injuries; Workers' Compensation, which administers the claims of employees who are injured on the job; and Disability Services.

From 1993 through 1998, 16 scale operators reported 23 repetitive motion or overexertion injuries to Safety and Claims Management. (For simplicity, these injuries are referred to in this report as repetitive motion injuries.) The main factor listed for these injuries was opening and closing the scale house sliding doors or windows used for customer access. As of May of this

[1] The drop box at Cedar Falls is included as one of the transfer stations throughout this report for ease of reference.

[2] Because the landfill is not open to the general public, the duties there are considerably different. The landfill scale operators' responsibilities include tracking tonnage and scheduling Solid Waste trucks to the transfer stations to pick up waste.

year, $254,533 had been paid out on these injuries, primarily for medical bills and time lost from work, and four of the repetitive motion claims remained open, meaning that the employees' doctors reported that their condition had not stabilized and they were still recovering.

Repetitive Motion Injuries

Repetitive motion injuries, also called cumulative trauma disorders, musculoskeletal disorders, or ergonomic injuries, are disorders involving soft tissues such as muscles, tendons, ligaments, and nerves. They develop gradually as a result of repeated microtrauma and are often ignored until the symptoms become chronic. Left untreated, they can produce significant and lasting disability. Many jobs associated with these injuries involve performing simple, forceful repetitive tasks such as gripping or pushing. The major ergonomic risk factors are force, repetition, vibration (e.g., from power tools), awkward postures, and insufficient recovery time, or a combination of these factors. An additional factor is an aging workforce, because as a person ages the body's resilience to chronic wear and tear is reduced.

According to the Washington State Department of Labor and Industries (L&I), repetitive motion injuries are the largest category of work-related injuries and illnesses in the state. They account for 30% of all workers' compensation claims in Washington and more than 40% of the total costs, over $410 million a year in medical costs and lost wages alone. In May 2000, L&I introduced new ergonomics standards with the goal of reducing the incidence of work-related repetitive motion injuries. Even before the new ergonomics standards, however, the state's "safe place standards" required employers to provide a work site "free from recognized hazards that are causing or likely to cause serious injury or death."

FINDING 1

THE RESPONSE OF THE SOLID WASTE DIVISION AND SAFETY AND CLAIMS MANAGEMENT TO THE SERIES OF REPETITIVE MOTION INJURIES AMONG THE SCALE OPERATORS WAS NOT TIMELY OR PREVENTATIVE.

From 1993 through 1998, 23 repetitive motion injuries were reported by 16 Solid Waste Division scale operators. The first injury was reported in October 1993. In July 1994, another repetitive motion injury was reported and altogether five injuries occurred that year. Two injuries were reported in 1995, and one in 1996. Eight injuries occurred in 1997, and six in the first six months of 1998.[3] Between May and September of 1998, the Solid Waste Division replaced the manual sliding doors at five scale houses with automatic doors that opened by pushing a button. Since then, only one repetitive motion injury has been reported. In 1999 the sliding windows at the other scale houses were automated.[4]

Multiple Cases of Repetitive Motion Should Trigger Work Place Evaluation

According to the American College of Occupational and Environmental Medicine, multiple cases of repetitive strain injury indicate a "sentinel condition" that should trigger evaluation of the workplace by health and safety professionals. An effective workers' safety program should therefore take an immediate and preventative approach to multiple reports of these injuries occurring within a single job classification. Between 1993 and 1998, however, the response of the Solid Waste Division and Safety and Claims Management to the series of injuries was delayed and reactive. During that time:

[3] Two injuries in 1997 were reported on the same day by the same operator, but were recorded as separate claims because they involved different body parts. The same occurred with two injuries in 1998.

[4] The window at the Cedar Falls drop box was not automated due to low volume at the site. In addition, the doors at the Cedar Hills landfill were not automated because they are not used for customer transactions.

- Safety and Claims ignored significant discrepancies in its evaluations of the ergonomic risk factors at the scale houses;
- Solid Waste delayed making scale house improvements that would minimize or eliminate the factors contributing to the injuries; and
- Safety and Claims took a conservative approach in making recommendations for work place improvements.

Safety and Claims Ignored Significant Discrepancies in the Measured Force to Open and Close Scale House Doors

One of the ergonomic risk factors for repetitive motion injuries is the amount of force used in the job. The pull force needed to open and close the sliding glass doors and windows at various scale houses was measured three different times by Safety and Claims Management staff and once by an ergonomics consultant. The table below shows the pull forces measured at each scale houses and when they were measured. The forces are given as ranges because the measurements at each site included two doors or windows – one for inbound and one for outbound customers – and the opening and closing forces. Variations among the scale houses depended on when maintenance on the doors was last performed and the amount of settling of the building, which could distort the doorframes. The first six sites listed have sliding doors; the last two have windows.

EXHIBIT
Recorded Pull Force Requirements for Scale House Doors

	Safety and Claims Management Measurements			Consultant Measurements
Site	Oct. 1994	Jan. 1995	April 1998	May 1998
Algona			3 - 4.5 lbs.	13 - 15 lbs.
Bow Lake		1 - 2 lbs.	1.5 - 3.5 lbs.	9 - 12 lbs.
Cedar Hills	11.5 - 15 lbs.			
Factoria		1.5 - 4 lbs.	2 - 4 lbs.	9 - 14 lbs.
First Northeast			3 - 4.5 lbs.	9 lbs.
Renton	5 - 9 lbs.	1 - 5 lbs.	2.5 - 4.5 lbs.	8 - 14 lbs.
Enumclaw			2.5 - 4 lbs.	
Houghton			1 - 3 lbs.	2 - 6 lbs.

SOURCES: Safety and Claims Management memos; notes provided to audit staff from Stewart and Associates

The Measured Force to Open and Close Scale House Doors Varied Widely

As the exhibit shows, the pull forces that were measured at the scale houses varied widely. The first measurements were made in October 1994 by an ergonomist from Safety and Claims Management, who recorded pull forces between 5 and 15 pounds. In January 1995, a safety officer from Safety and Claims went to three sites and measured noticeably lower pull forces, shown in the second column. However, he wrote in a memo that the doors were "fairly heavy," which seems inconsistent with the light forces measured. For example, his measurements at Renton showed forces of only 1 to 5 pounds, as opposed to the earlier measurements of 5 to 9 pounds.

One Measured Force Was Near the High End of Acceptable Weight

Because pull force is a major ergonomic risk factor, the discrepancies among the first two sets of measurements should have triggered immediate scrutiny. The discrepancies were especially significant because, based on ergonomics

recommended guidelines published in 1993, "For frequent exertions, the maximum one-handed pull force should not exceed 10kg [22 pounds] for males and 7kg [15.4 pounds] for females." Thirty-one of the thirty-seven scale operators are women. Thus, the 15 pounds of pull force reported by the ergonomist was near the limit for what an average scale operator could be expected to perform repetitively. However, Safety and Claims did not follow up on the discrepancies in the measured pull force to determine if the weights were indeed near the limit of acceptable force.

Safety and Claims did not even measure the pull forces again until April 1998, in response to a letter from Local 6 asking what was being done to address the scale operators' repetitive motion injuries. At that time, another safety officer from Safety and Claims measured the pull forces at seven scale houses. Those measurements are shown in the third column of the table. They were also relatively low although, again, he wrote that the doors were "fairly heavy."

According to Safety and Claims Management, the difference among the measurements was due to differences in technique. The ergonomist measured the force of using a quick jerking movement to open the door, attempting to duplicate the movement a scale operator would use. The two safety officers used a smoother and slower motion in their measurements. However, the purpose of the measurement is to duplicate as closely as possible the motion actually used by the scale operators. Measuring the least amount of effort needed to pull open the door does not provide the information necessary to understand the risk factors or major stressors of the job.

The measurements by Safety and Claims Management staff can be compared with those of an ergonomics consultant who was

hired in May 1998 to provide training to the scale operators. (It should be noted that the decision to automate the doors had already been made by then.) The consultant's credentials included serving on the L&I advisory committee that set the new state ergonomics standards and being a lecturer at the University of Washington School of Public Health and Community Medicine. Her memo to the Solid Waste Division did not list the forces for each station, but it summarized them by stating that "Pull forces on the sliding doors revealed 8-15 lbs. of pull force to open (initiating movement) and 10-15 lbs. to close…While these forces are not excessive, when combined with 400-600 repetitions per day, it can be fatiguing." Her measurements for individual scale houses are from her notes, which she provided to audit staff. As the exhibit shows, her weights were closest to the first measurements made by the Safety and Claims Management ergonomist in 1994, and both were at the high end of the acceptable pull force.

The Higher Weights Were Ignored in Favor of the Lower Weights

The differences among the various measured forces were never reconciled. Instead, the lower forces were the ones used in county documents discussing the doors and the injuries. For example, a survey of other scale houses and comparable jobs conducted by the Solid Waste Division in 1998 noted that "the average force required at the seven county transfer stations are between 2 to 4 lb. of force to operate," while the forces at other, non-county sites were listed at 1½-2 lbs., 10 lbs., 1 lb., and 3-5 lbs. (depending on the site), and concluded that "The amount and nature of work our scale operator does is comparable and in some cases less than the work required by other organizations in similar positions. The force required to operate our transaction sliding window/door is about average or below that of the other

facilities, and they have no related injuries reported." The fact that the lower weights were the ones used may be one reason that Solid Waste did not act more promptly in addressing the scale operator injuries.

The lower weights were also used in the job analysis of the scale operator position, which describes the essential functions of a job and is given to a doctor treating an injured employee. When the job analysis was created, it used the lower weights for the sites that had not been automated: the three scale houses with windows and the scale house at Cedar Hills. Using the lower weights for those scale houses prevented doctors from fully understanding the physical requirements of the job.

Safety and Claims and Solid Waste Were Both Slow to Act Upon Indications of an Ergonomic Hazard

Safety and Claims Management Did Not Measure the Force of the Doors Until Four Injuries Had Occurred

An ergonomist from Safety and Claims Management visited two scale houses in July 1994 after the first two injuries were reported. She noted that the sliding doors at one were "very heavy" and that "the repetitive motion of opening and closing them all day can lead to shoulder, wrist and elbow injuries," while the windows at the other site were "much lighter and easier to move." However, it was not until October 1994, after two more injuries had been reported, that she examined the major risk factors of the job and made recommendations on how to reduce them. At that time, she measured the pull force to open and close the sliding doors at two scale houses (as discussed above) and looked at the customer count to estimate the number of times the doors would need to be opened and closed – 400 each on a weekday, which would be slower than a weekend. Both of these – force and repetition – are risk factors that should be included in any ergonomic evaluation.

Solid Waste Did Not Act on Recommendations for Ergonomic Evaluations of All of the Scale Houses

An environmental consultant's evaluation of the transfer stations in September 1996, while focused on the exposure of transfer station workers to contaminants (e.g., carbon monoxide), also noted the number of repetitive motion injuries and recommended ergonomic evaluations of the scale houses. In February 1997 the Transfer Station Improvement Team also recommended ergonomic evaluations of the scale houses. However, the Solid Waste Division never acted on those recommendations and thus there was never a complete ergonomic evaluation of all of the scale houses in response to the injuries.

No one even measured the forces to open and close the doors at all of the transfer stations until January 1998, and then only in response to a request for information from Local 6. Safety and Claims staff went to the transfer stations with sliding doors and measured the force to open and close them, although a complete ergonomic evaluation was not conducted. As discussed above, however, those measurements were considerably lower than previous measurements.

A Job Analysis for the Scale Operators Was Not Conducted Until 1998

A job analysis lists the essential functions of the job and is given to an injured employee's doctor so they can indicate any restrictions (e.g., no lifting over 15 pounds) on the employee's return to work. Job analyses were developed by the Diversity Management Division in the Office of Human Resources Management. However, Safety and Claims Management did not request a job analysis for the scale operator position until 1998. Before that, injured scale operators told the doctor their understanding of the job requirements, but this was not necessarily an accurate source of information. For example, one

scale operator indicated that the force to open and close the doors at her site was between 20 and 30 pounds. Whether under- or overestimating the amount of force, the result was that the doctor was not getting accurate information about the work conditions and demands. If the scale operator overestimated the required force, the doctor could unnecessarily delay her return to work; if she underestimated it, the doctor could release her for work prematurely, making her more susceptible to reinjury.

Solid Waste Delayed Making Ergonomic Improvements to the Scale Houses

Safety and Claims Recommended Bar Handles Twice Before They Were Installed

In a memo from the site visits in October 1994, the ergonomist noted that "Reducing the repetitive stress of opening the cashier station doors has been an ongoing discussion." She made several recommendations: removing the weather-stripping on the doors to lessen rolling resistance; installing newer, lighter doors; installing single pane doors; and installing large D-shaped bar handles on the doors. (At the time the doors had only the small metal handles typical of sliding glass doors.) She noted that removing the weather-stripping on one door had reduced the force to open it from 14.5 pounds to 11.5 pounds. After two more repetitive motion injuries were reported, a safety officer from Safety and Claims visited the scale houses in January 1995 and also recommended installing different handles. The Solid Waste Division began installing the bar handles in February 1995. By August 1995 they had been installed on all of the sliding doors, although not the sliding windows.

Solid Waste Did Not Act on Other Recommendations That Would Have Reduced the Weight of the Doors

The Solid Waste Division also removed the weather-stripping on the doors to reduce drag. However, Solid Waste did not implement the other recommendations aimed specifically at reducing the weight of the doors, i.e., installing newer doors and

replacing the double pane door with a single pane. The bar handle, while it may have helped with the motion to open and close the doors, did nothing to reduce the force needed to open and close them. Moreover, as noted above, the bar handles were never installed on the sliding windows used for customer transactions at three scale houses, although one operator reported an injury from using the sliding windows during the time the handles were being installed.

Injuries Temporarily Decreased After the Bar Handles Were Installed

The number of upper body repetitive motion injuries decreased considerably after the bar handles were installed. One injury was reported in March 1995, before installation of the handles was completed, and, as noted above, an operator at a scale house with sliding windows reported an injury in July 1995. One injury occurred in 1996.

There Were Eight Injuries in 1997 Before Safety and Claims and Solid Waste Considered Automated Doors

However, there were eight repetitive motion or overexertion injuries in 1997, beginning in February. (Two of those injuries were reported by the same operator on the same day, but involved different upper body parts.) It was not until early 1998 that the Solid Waste Division began looking at automating the doors to eliminate them as a risk factor. Even so, automation of the doors began as a reactive effort to return an injured scale operator to work at her assigned scale house and not as an attempt to find a solution to the high number of repetitive motion injuries. The automation was proposed as a modification for only the Factoria scale house so the operator could be released by her doctor to return to work. In January 1998, Safety and Claims Management hired a consultant to research and recommend a mechanism to automatically open and close the doors.

The Doors Were Automated in 1998

Shortly after the doors at Factoria were automated in May 1998, the Solid Waste Division began automating the doors at the other scale houses, and the four other transfer stations with sliding doors all received automated doors by September 1998. The speedy decision to automate the other doors was at the direction of the County Executive, who had been contacted by some of the injured scale operators. Also in May, an inspector from the state Department of Labor and Industries opened an investigation of the scale houses at the request of the scale operators. He issued a finding of "no violation" on July 13, 1998. According to the inspector, the finding of no violation was made because King County told him that they were going to automate the scale house doors.

The total cost of equipment and installation for automating the doors at the five sites was $20,430, or just under $4,100 per site. Based on the number and cost of the repetitive motion injury claims between 1993 and 1998, the doors paid for themselves in the first four and a half months they were installed. Moreover, the county received $8,147 from the state under a program that reimburses jurisdictions for part of the cost of improvements that return injured employees to work.

Scale Operators Were Almost Unanimous in Their Praise of the Automated Doors

In interviews with scale operators, most said that the bar handles were an improvement. They were almost unanimous, however, in their praise of the automated doors and windows. Comments such as "the best thing Solid Waste ever did" were typical, even from operators who had not suffered repetitive motion injuries.

Solid Waste Made Other Improvements to the Scale Houses But Implementation Was Slow and Reactive

Between 1995 and 1999 Solid Waste Division made other improvements to the scale houses in addition to the bar handles and automated doors. However, many of the improvements took a long time. Moreover, they were often done in response to employees who were already injured rather than as part of a preventative safety program. Some of these improvements are outlined below.

- Laser card readers, to reduce the pinch grip and wrist motion of scanning, were installed at the scale houses in early 1999.
- Two injuries, in 1994 and 1998, were attributed to lifting the heavy entrance gates at the transfer stations. The gates were automated over several years, with the last one scheduled for automation in 2000.
- Anti-fatigue matting was recommended by Safety and Claims Management in 1994. It had been installed at every site except the Cedar Hills landfill by 1998.
- Glare screens for the monitors were installed in April 1995. They were recommended by Safety and Claims Management in July 1994.

Safety and Claims' Recommendations Were Conservative and Emphasized Administrative Controls

Engineering and Administrative Controls for Ergonomic Hazards

There are two main approaches to dealing with ergonomic hazards. Engineering controls are physical changes to the job that reduce or eliminate the employees' exposure to hazards. Engineering controls include redesigning the workstation, work methods, or tools to reduce the demands of the job, such as high force, repetitive motions, and awkward positions. Administrative controls refer to changes in work practices and policies such as

scheduling rest breaks, rotating workers through physically tiring jobs, and providing ergonomic training for workers.

Engineering Controls Are Generally Preferred

In some cases, administrative controls may be the most feasible. For example, scheduling rest breaks could be an effective control for office workers by giving them a break from the keyboard. However, research literature and ergonomists interviewed by audit staff indicated that engineering controls are generally preferred because they are relatively permanent methods of reducing or eliminating employees' exposure to hazardous conditions. According to the federal Occupational Safety and Health Administration, the focus of an ergonomics program is to make the job fit the worker and not the other way around. Engineering controls are especially preferred where the employee does not control the pace of the job and it is dictated by external factors, such as customer demand at the scale houses.

Bar Handles Were an Engineering Control That Appeared to Work

The initial response by Safety and Claims Management to the first two injuries was to conduct ergonomic training in July 1994. After two more injuries that year, Safety and Claims recommended bar handles for the scale house doors, in both 1994 and 1995, as well as other improvements to reduce the weight of the doors. The bar handles were an engineering control that appeared to be effective. After they were installed in 1995, only one injury was reported that year and another in 1996.

Safety and Claims Conducted More Training After Six Additional Injuries Were Reported

In 1997, however, a total of eight injuries were reported. After the sixth injury, Safety and Claims Management gave a

presentation on ergonomics at the scale operator safety meeting in October 1997. At the meeting some scale operators expressed satisfaction with the bar handles, while others were still concerned about the weight of the doors. However, the question of the doors was not addressed at that time except through training.

The ergonomic training provided by Safety and Claims Management emphasized good body mechanics and "walking" the doors open and closed instead of using just the arms and upper body. While many of the scale operators thought the training was useful, they also said that when they got busy they had no time to pay attention to how they opened and closed the doors. The ergonomics consultant who visited the scale houses in 1998 concurred that it was not practical to expect the employees to walk the doors open and closed because of the amount of time it took and the limited space to move within the scale houses.

Safety and Claims Recommended More Training in 1998

In March 1998, Safety and Claims Management and the Solid Waste Division met to discuss automating the doors at the Factoria scale house so that the worker assigned there could return to work. At that point, Factoria was the only scale house that was to get automated doors. At the meeting, Safety and Claims recommended more on-site ergonomic training for the operators, this time through consultants because Safety and Claims did not have the time they thought was necessary. Thus, even in 1998 Safety and Claims was continuing to recommend administrative controls in response to the scale operator injuries.

Executive Response to Finding 1

"Safety and Claims responded quickly to indications of an ergonomic hazard. We responded with multiple ergonomic evaluations, training sessions, and discussions with both

employees and department management. We recommended both administrative and engineering changes to the work areas, one of which, push bars, appeared to be successful. It did take an inordinate amount of time to determine and implement what turned out to be the best solution, automatic doors and windows."

RECOMMENDATIONS

1-1 Safety and Claims Management should work to develop a more proactive approach for responding to clusters of repetitive motion injuries, including the use of a case management system to ensure consistency in approach and work methods, and follow-up on its recommendations. Safety and Claims Management should also consider the use of consultants if safety issues are outside their areas of expertise.

Executive Response *"We agree that a creative, aggressive approach that emphasizes prevention is needed. To that end, we have had in place for two years an organizational structure that better allows us to identify clusters of injuries. We have a web-based process for responding to requests for ergonomic evaluations and for initiating them when appropriate. Our database contains ergonomic evaluations for 1550 King County employees. We are also preparing a strategic plan that will more closely integrate the ergonomic services provided by safety, with consulting expertise from disability services. We will also propose a new funding mechanism so we can have more control over implementation of our recommendations."*

Auditor's Comment The Executive Response generally describes broad measures that Safety and Claims is implementing in developing a preventive approach to identifying and responding to clusters of injuries. We hope that this approach will include the specific actions contained in the audit recommendation.

1-2 Safety and Claims Management should ensure that any documents related to the scale operator position, such as the job analysis, that are based on erroneous pull force measurements of the scale houses are revised using accurate information.

Also see Recommendation 2-2 on page 21.

Executive Response *"We have revised our job analysis for the Scale Operator position to reflect the highest pull force measurements that an operator may use when opening a door or window. These pull forces were not erroneously measured but simply reflect two different methodologies for measurements."*

FINDING 2 **THE SOLID WASTE DIVISION DID NOT HAVE AN EFFECTIVE PROCESS FOR PRIORITIZING WORK ORDER REQUESTS FROM EMPLOYEES. AS A RESULT, EVEN SIMPLE WORK REQUESTS THAT INVOLVED ERGONOMIC AND SAFETY ISSUES TOOK AN UNACCEPTABLY LONG TIME TO ACCOMPLISH.**

In addition to the delay in action on Safety and Claims Management's recommendations, it took the Solid Waste Division a long time to act on work requests from scale operators, even those related to ergonomic or safety issues that should have been prioritized. For example, when one new scale house was built it had a small metal button the size of a pencil eraser to open and close the automated doors. The scale operators complained that the button required an awkward wrist angle and more force to press, and submitted multiple work requests. After one year, a metal plate to press was placed over the button. This was a simple and effective solution that should not have taken a year to implement.

In a visit to an injured scale operator in 1996, the Safety and Claims ergonomist noted that because the sliding windows were fairly high from the floor, the operator had to reach up and over to conduct customer transactions, which was probably associated with her injuries. Wooden platforms were built to raise shorter scale operators to the level of the window. When lower windows were installed in October 1999, the scale operator requested that the platforms be lowered accordingly. It took another nine months to get the platforms shortened. In the meantime, having

higher platforms with the lower windows may have exacerbated the reaching problem because the scales at that site were lower than the scale house.

Furthermore, after the diagonal bar handles recommended by Safety and Claims Management were installed in 1995, scale operators requested a second, vertical bar handle so that they could use both hands when opening the doors. In at least one case it took six months for the additional handle to be installed.

Many of the scale operators interviewed by audit staff said that the Solid Waste Division was slow to act on their work requests, although some noted recent improvements in the response time. One reason for the delay was the variety of ways to request repairs or maintenance. Solid Waste management asked that employees fill out a work order request and give it to their supervisor. However, several scale operators indicated that this method took the longest. They preferred to call the maintenance workers directly because that usually resulted in the quickest response. Others took their safety requests to the safety meetings. If requests were not acted upon after three times, they would be escalated to the Employee Safety Advisory Board (ESAB), per ESAB policy. Since the safety meetings were held only once a quarter, issues would be at least nine months old before they reached the ESAB.

Audit staff recognize that there are numerous work order requests from employees and that they are of widely varying importance. A systematic process for reviewing and prioritizing work orders would help ensure that ergonomic and safety concerns are addressed promptly. In addition to the safety issues, unreasonable delays in making relatively simple repairs can affect employee morale.

It should be noted that in late 1999 the Solid Waste Division hired a safety officer to fill a newly created position. The safety officer indicated to audit staff that his priorities included improving communication with employees and improving responsiveness to work order requests.

RECOMMENDATIONS

2-1 Solid Waste Division management should review and revise its system for employee work order requests to ensure a consistent, timely, and responsive process. Revisions should focus on development of a system to prioritize work orders based on safety concerns. They should include procedures for notifying employees if their request will be acted upon and if so, when, and set time limits for completing work orders based on assigned priorities.

2-2 Solid Waste Division management, with the new safety officer, should review and modify the division's existing safety program to emphasize prevention through a prompt and effective response to emerging safety issues. The program should include a systematic process for following up on the implementation of safety recommendations and monitoring the results.

Executive Response to Recommendations 2-1 and 2-2

"We agree. Continuing to improve the work-order system is a priority. Changes to the work order process continue under the direction of the new Operations Manager, with input from the Safety Officer, Shop Supervisor, shop personnel, Scale Operators, Transfer Station Operators, and others. The Solid Waste Operations Manager expects to have the worker changes to be completed within 60 days. Changes are focusing on overall improvement of the general work order process including new forms and time lines for completion of work.

"Safety issues will be directed outside of the normal work order process, by having employees bring safety repair issues directly to their supervisor, or to the Division Safety Officer. This process is already in place. Work orders that are safety related will be copied to the affected supervisor and the Division Safety Officer.

"Solid Waste Division management and the Division Safety Officer encourages timely responsiveness to employee safety and customer safety concerns and encourages all employees to address these concerns outside of the normal work order process. All employees have direct access to the Safety Officer during all hours of operation, 7 days per week via pager. The Division is in the process of final development and implementation of a safety management database to review injuries by type and causal factors. This will enable us to become more effective in managing safety prevention. The current time line for completion of the database is 120 days."

FINDING 3

THE SOLID WASTE DIVISION AND SAFETY AND CLAIMS MANAGEMENT MAY FACE MORE ERGONOMIC ISSUES IN THE FUTURE ASSOCIATED WITH REPETITIVE REACHING OUT THE DOORS OR WINDOWS FOR CUSTOMER TRANSACTIONS.

Forceful Motion Was Eliminated From the Job

As discussed earlier, ergonomic risk factors include force, repetition, awkward postures, and insufficient recovery time, and especially a combination of any of these factors. By automating the sliding doors and windows and the entry gates, Solid Waste eliminated force as an element of the scale operators' job. The only repetitive motion injury since the doors were automated was reported in May 2000, and was attributed to repetitive reaching out the windows to customers.

Reaching Problems Could Indicate Posture as a Risk Factor

Problems with the reaching motion could indicate posture as a risk factor. In interviews with 18 scale operators, audit staff noted that the nine operators who thought that reach was a problem had all reported an upper body repetitive motion injury.

A few scale operators wanted drive-through bank teller-type drawers installed to reduce the reaching motion. However, Safety and Claims Management had evaluated the drawers and concluded that they would actually increase ergonomic stress because they would increase the number of upper body motions

for customer transactions. The Solid Waste Division decided not to install the drawers.

The bank drawers were a divisive issue among the scale operators. Some were adamantly in favor of the drawers. Others were just as adamant that they did not want them because they would take up too much room in the smaller scale houses, reduce interaction with customers, and so result in poorer customer service. They also felt that it was not possible to eliminate all movement from the job. In the middle were those who were neutral and wanted to stay out of the disagreement.

Repetition Continued to Be Part of the Scale Operators' Job

Commercial haulers have accounts with Solid Waste and use the facilities on a self-serve basis, so that the scale operators serve only the "self hauls," i.e., non-commercial cash customers. Overall, the number of self hauls remained relatively constant between 1992 and 1999. The highest volume in those years was 785,000 in 1993, the lowest was 637,000 in 1996, and 686,000 self hauls were recorded in 1999. Thus, repetition would continue to be a factor in the job unless Solid Waste increased the number of self-service customers by allowing self haul customers to use credit and debit cards. However, this could also potentially reduce the need for scale operators to staff the transfer stations.

The 7/10 Work Schedule Did Not Provide Sufficient Recovery Time

Ergonomists interviewed by audit staff thought the work schedule of the scale operators would be a factor in repetitive motion injuries. They said that ten-hour work days would not give the body sufficient time to recover from the microtraumas of the job, and with working seven consecutive days, even a week off would not be enough to recover from the injuries sustained over a week. It should also be noted that the tables of maximum acceptable force for various tasks that audit staff reviewed were based on the assumption of an eight-hour workday. Moreover,

an additional risk factor is age, because as a person ages the body's resilience to chronic wear and tear is reduced. The median age of the scale operators was 46.

Scale Operators Saw the Work Schedule as a Benefit

Most scale operators considered the schedule a major benefit of the job because it gave them a whole week off from work and they did not want it changed. In fact, one reason for the divisiveness among the scale operators was because some worried that continued scrutiny of the injuries might focus attention on their work schedule, with possible attempts to change it in future labor negotiations.

Almost all of the operators worked overtime, which could further reduce the time for recovery. However, audit staff did not see a clear correlation between overtime worked and subsequent repetitive motion injuries. Four of the seven operators who reported repetitive motion injuries in 1997 worked over 170 hours of overtime each that year, and three of the five operators with injuries in 1998 had worked over 138 hours of overtime each. On the other hand, other operators worked as much or more overtime, some year after year, and did not report any repetitive motion injuries.

Audit staff did note that one scale operator with an open repetitive motion claim worked 56 hours of overtime in 1999. Overtime is allocated based on the terms of the bargaining agreement. However, audit staff question the wisdom of allocating overtime to employees who are still recovering from work-related injuries.

The pay scale encouraged overtime because there was a single hourly pay rate for all full-time transfer station scale operators.[5]

[5] There was a pay differential for working nights, which applied only to the Factoria transfer station, and for working at the Cedar Falls drop box.

In 1999, the rate was $15.12. The only pay increases were the annual raises and cost-of-living allowances specified in the bargaining agreement. Thus, the only opportunity for increased income was by working overtime.

Conclusion

The slow response by the Solid Waste Division and Safety and Claims Management to the earlier repetitive motion injuries has hurt their credibility that they will act in the employees' best interests. It is therefore important for both the Solid Waste Division and Safety and Claims Management to research and analyze ergonomic risk factors more thoroughly and act more promptly upon any future clusters of injuries than they did the earlier repetitive motion injuries.

RECOMMENDATIONS

3-1 In the event of future clusters of repetitive motion injuries, Solid Waste Division management and Safety and Claims Management should consider contracting with an ergonomics specialist for evaluations of the scale houses and the motions required to perform the function of scale operator, with prompt implementation of the specialist's recommendations.

Executive Response

"We agree: This has been done for ergonomic issues we are aware of currently and will be repeated if required for future occurrences."

3-2 In the event of future clusters of repetitive motion injuries, Solid Waste Division management should review the work schedule of the scale operators for possible revision in future contract negotiations.

3-3 Solid Waste Division management should review contract provisions regarding overtime for possible modifications in future labor negotiations in order to prevent employees with open injury claims from working overtime.

Executive Response to Recommendations 3-2 and 3-3

"The Solid Waste Division does not believe a global change, affecting all bargaining unit employees, in current contract language is needed. The Division will review the recommended work modifications on a case by case basis based on individual circumstances and current regulations with the support and recommendations of the Safety and Claims Division."

FINDING 4

SOLID WASTE DIVISION MANAGEMENT INCLUDED THE SCALE OPERATORS IN DESIGNING NEW SCALE HOUSES.

At the time of the audit the Solid Waste Division was in the process of designing new scale houses to replace some of the older buildings that were basically small shacks. Scale operators said that they had been involved in the design of the buildings and seen their ideas incorporated into the blueprints. In addition, the division took some of the improvements that were made at specific scale houses in order to return injured employees to work and included those in the plans as well. Some of the proposed ergonomic features included:

- Automated windows instead of doors, to eliminate the uneven balconies that have been a problem for some operators;
- Lower windows to make it easier to reach customers;
- Adjustable workstation tables that raise or lower by pressing a button; and
- Positioning the outbound customer window to face customers and minimize twisting and reaching.

This cooperative design process has the potential to result in more ergonomic features built into the scale houses rather than retrofitting them later. In addition, it gives the Solid Waste Division an opportunity to build communication with the scale operators by encouraging and using their input.

RECOMMENDATION

4-1 Solid Waste Division management should continue to work with and solicit input from the scale operators regarding the design features of the new scale houses and related features of the transfer stations.

Executive Response *"We agree."*

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APPENDIX

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EXECUTIVE RESPONSE

King County Executive
RON SIMS

RECEIVED
DEC 8 2000
KING COUNTY AUDITOR

December 6, 2000

Don Eklund
King County Auditor
Room 402
C O U R T H O U S E

Dear Mr. Eklund:

Thank you for your memorandum of November 17, 2000, and the opportunity to review and comment on your Preliminary Draft – Management Audit of Scale Operator Injury Claims.

Enclosed is a detailed response to the specific findings and recommendations included in the preliminary draft audit. If you have any questions about this response, please call Rod Hansen, Manager, Solid Waste Division, at (206) 296-4385, or Katrina Zitnik, Manager, Safety and Claims Management, at (206) 296-0503.

Sincerely,

Ron Sims
King County Executive

RS:cz

cc: Pam Bissonnette, Director Department of Natural Resources
Rod Hansen, Manager, Solid Waste Division
Katrina Zitnik, Manager, Safety and Claims Management
David Lawson, Manager, Executive Audit Services

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Solid Waste Division and Safety and Claims Division
Response to Scale Operator Injury Audit:

Finding No. 1:

The response of the Solid Waste Division and Safety and Claims to the series of repetitive motion injuries among the Scale Operators was not timely or preventative.

Response:

Safety and Claims responded quickly to indications of an ergonomic hazard. We responded with multiple ergonomic evaluations, training sessions, and discussions with both employees and department management. We recommended both administrative and engineering changes to the work areas, one of which, push bars, appeared to be successful. It did take an inordinate amount of time to determine and implement what turned out to be the best solution, automatic doors and windows.

Recommendation No. 1-1:

Safety and Claims Management should work to develop a more proactive approach for responding to clusters of repetitive motion injuries, including the use of a case management approach to ensure consistency in approach and work methods, and follow-up on its recommendations. Safety and Claims Management should also consider the use of consultants if safety issues are outside their areas of expertise.

Response:

We agree that a creative, aggressive approach that emphasizes prevention is needed. To that end, we have had in place for two years an organizational structure that better allows us to identify clusters of injuries. We have a web-based process for responding to requests for ergonomic evaluations and for initiating them when appropriate. Our database contains ergonomic evaluations for 1550 King County employees. We are also preparing a strategic plan that will more closely integrate the ergonomic services provided by safety, with consulting expertise from disability services. We will also propose a new funding mechanism so we can have more control over implementation of our recommendations.

Recommendation No. 1-2

Safety and Claims Management should ensure that any documents related to the Scale Operator position, such as the job analysis, that are based on erroneous pull force measurements of the scale houses are revised using accurate information.

Response:

We have revised our job analysis for the Scale Operator position to reflect the highest pull force measurements that an operator may use when opening a door or window. These pull forces were not erroneously measured but simply reflect two different methodologies for measurements.

Recommendation No. 2-1:

Solid Waste Division management should review and revise its system for employee work order requests to ensure a consistent, timely, and responsive process. Revisions should focus on development of a system to prioritize work orders based on safety concerns. They should include procedures for notifying employees if their request will be acted upon and if so, when, and set time limits for completing work orders based on assigned priorities.

Recommendation No. 2-2:

Solid Waste Division management, with the new Safety Officer, should review and modify the Division's existing safety program to emphasize prevention through a prompt and effective response to emerging safety issues. The program should include a systematic process for following up on the implementation of safety recommendations and monitoring the results.

Response to No. 2-1 and 2-2:

We agree. Continuing to improve the work-order system is a priority. Changes to the work order process continue under the direction of the new Operations Manager, with input from the Safety Officer, Shop Supervisor, shop personnel, Scale Operators, Transfer Station Operators, and others. The Solid Waste Operations Manager expects to have the worker changes to be completed within 60 days. Changes are focusing on overall improvement of the general work order process including new forms and time lines for completion of work.

Safety issues will be directed outside of the normal work order process, by having employees bring safety repair issues directly to their supervisor, or to the Division Safety Officer. This process is already in place. Work orders that are safety related will be copied to the affected supervisor and the Division Safety Officer.

Solid Waste Division management and the Division Safety Officer encourages timely responsiveness to employee safety and customer safety concerns and encourages all employees to address these concerns outside of the normal work order process. All employees have direct access to the Safety Officer during all hours of operation, 7 days per week via pager. The Division is in the process of final development and implementation of a safety management database to review injuries by type and causal factors. This will enable us to become more effective in managing safety prevention. The current time line for completion of the database is 120 days.

Recommendation No. 3-1:

In the event of future clusters of repetitive motion injuries, Solid Waste Division management and Safety and Claims management should consider contracting with an ergonomics specialist for evaluations of the scale houses and the motions required to perform the function of Scale Operator, with prompt implementations of the specialist's recommendations.

Response:

We agree: This has been done for ergonomic issues we are aware of currently and will be repeated if required for future occurrences.

Recommendation No. 3-2:

In the event of future clusters of repetitive motion injuries, Solid Waste Division management should review the work schedule of the Scale Operators for possible revision in future contract negotiations.

Recommendation No. 3-3:

Solid Waste Division management should review contract provisions regarding overtime for possible modifications in future labor negotiations in order to prevent employees with open injury claims from working overtime.

Response:

The Solid Waste Division does not believe a global change, affecting all bargaining unit employees, in current contract language is needed. The Division will review the recommended work modifications on a case by case basis based on individual circumstances and current regulations with the support and recommendations of the Safety and Claims Division.

Recommendation No. 4-1:

Solid Waste Division should continue to work with and solicit input from the Scale Operators regarding the design features of the new scale houses and related features of the transfer stations.

Response:

We agree.

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REPORTS BY THE KING COUNTY AUDITOR'S OFFICE

1980 - 1991

1980 Police Officer Hiring Process (M)
Accounts Payable System (F)
Public Works Equipment Rental and Revolving Fund (M/F)
Financial Management of Forward Thrust Bond Proceeds and General Obligation Bond Levy Monies (M/F)

1981 Housing Programs Study (S)
Harborview Medical Center 1977 Construction Capital Project Fund (F)
King County Budget Process (M)
King County Jail Cash Management Functions (F)
Emergency & Inpatient Alcoholism Treatment Programs (M)
King County Park Operations (M)
1980 Year-End Expenditure Transactions (F)

1982 Investment Program Internal Controls (F)
King County Jail Cash Mgmt. Functions (F)
Police Staffing, Allocation & Scheduling Audit (M)
Cash Management of Federal Funds (F)
King County Park Acquisition and Development Fund, 1968-1981 (F)
City of Seattle Park Acquisition and Development Fund, 1968-1981 (F)
King County Arterial Highway Development Fund/City of Seattle Arterial Development Fund, 1968-1980 (F)
Dept. of Judicial Administration Internal Controls (F)
Sheriff's Real Property Sales (M)
Road Fund Property Holdings (M)
Emergency Medical Services Division/Funding Allocation, Service Delivery, & Financial Management Functions (M)
Public Defense System (F)

1983 1966 Harborview Hospital Construction Fund (F)
Follow-Up Study, King County Park Operations (S)
New Jail Construction Contract Administration (F)
King County Investment Management (F)
Gambling Tax Collection Process & Internal Controls (F)

1984 Solid Waste Staff Utilization (M)
DPPRC--Systems Development Process (M)
King County Parking Facilities Study (S)
Residential Real Prop. Assessment Level & Uniformity (M)
Roads CIP Budgeting and Scheduling Practices (M)
Review of King County Accounting Funds (S)
BALD Permit Fee Collection Process (F)

1985 Alcoholism and Substance Abuse Services Division Receivables (F)
Test of Real Property Tax Systems Computer Files (F)
Budgetary Staffing Standards (M)
Police Overtime Usage and District Court Scheduling (S)
Roads CIP Budgeting and Staffing Practices Follow-Up (M)
Insurance Fund (F)
King County International Airport (F)
Equipment Management/Utilization, Maintenance, & Replacement Practices (M)

1986 Business License Inspection Practices (M)
County Gasoline Contract (M)
Parks Maintenance (M)
Collective Bargaining Agreements (M)
Finance Office Cashiering (M)
Risk Management (M)
H&CD Housing Loans Administration (F)
Public Defense Program Fund Balance Levels (F)
King County Reporting of State Excise Tax (F)
Department of Public Safety, Financial and Personnel Administration (S)

1987 Harborview Medical Center Master Plan and CIP (M)
Jail Intake, Transfer, and Releases (M)
County Airport Historical Funding (F)
County Airport Operations (M)
Motor Pool Financing (S)
Meat Inspection Program (M)

1988 Accounts Payable (F)
Public Health Pooling Fund (S)
DPH Financing Provisions of 1984 Interlocal Agreement (S)
District Courts Time-Pay Collections Clerks (S)
Political Contributions by Charitable Organizations (S)
Surplus Personal Property (F)
Solid Waste Cashiering (F)
Project Management Cost Allocation Procedures (F)
Court Services (M)
Natural Resources and Parks Division Rental Houses (S)
M/WBE Utilization Requirements for Financial Services Contracts (S)
DPH, County Funded Community-Based Health Clinics and WIC Program (S)
Court Detail, Operation and Staffing (M)
Jail Classification Services (M)
Restaurant Inspection Program (M)

1989 Audit Coverage in King County Government (S)
Real Property Records (M)
Solid Waste Accounts Receivable (F)
Department of Public Health Car Rental (S)
Records Management (S)
Department of Public Health, Computer System Planning and Development (S)
Performa '87 (F)
Parks Capital Improvement Program (M)
1988 Consultant Selection Processes for Harborview Capital Projects (S)

1990 Jail Intake, Transfer and Release -- Workload, Operations and Staffing (M)
Arbitrage Rebate Requirements on Tax-Exempt Bonds (F)
Conservation Futures (F)
Real Property Sale, Lease & Exchange Practices (M)
Youth Services (M)
Office of Civil Rights & Compliance (M)
Criminal Investigations & Special Operations (M)
Business and Occupation and Public Utility Taxes (F)
Earthquake Preparedness (M)
District Courts and Warrants Division Revenues (S)
State Auditor Use of County Facilities and Equipment (S)
Department of Youth Services Health Program (M)
Code Enforcement Program Building and Land Development Division (M)
Assigned Take Home Vehicles and Agency-Paid Parking (S)

1991 Carpentry Shop (F)
County Fuel Station Internal Controls (F)
County Agency Performance Monitoring Survey (S)
King County Elections Practices (M)
King County Purchasing Agency (M)
Farmlands and Open Space Preservation Program (M)
King County Detoxification Center (M)
Dept. of Public Safety Field Training Officer Program (S)

REPORTS BY THE KING COUNTY AUDITOR'S OFFICE

1992 - PRESENT

1992
- King County Office of Emergency Management (S)
- King County Dept. of Stadium Administration Revenues (F)
- Environmental Health Charges to Solid Waste (S)
- Sierra PERMITS Automation System (M)
- King County Office of Human Resource Management (M)
- BALD Financial Guarantee Administration (M)
- Northshore Youth and Family Services (F)
- Dept. of Youth Services Drug & Alcohol Program (M)
- Dept. Adult Detention & Youth Services Overtime (S)
- SEPA Revenues and Accounts Receivable (F)
- Methodology for Funding Legal Services for Non-Current Expense Fund Agencies (S)
- Accounts Payable (F)
- Solid Waste Equipment Replacement Practices (M)

1993
- Dept. of Development and Environmental Services Assigned Vehicles (M)
- Certificate of Occupancy Process (M)
- Collection of Civil Penalties and Recovery of Abatement Costs (F)
- DDES Field Inspection Function (M)
- Police Overtime for Court Appearances (M)
- Dept. of Youth Services Sex Offender Unit and Special Sex Offender Dispositional Alternative Program (M)
- Office of Open Space Financial Administration (M/F)
- Collection Enforcement Section (S)
- Cellular Phones (S)
- Surface Water Management Service Charges (F)
- Acceptance of Special Waste at County Landfills (S)
- Solid Waste Division Internal Controls for Handling and Storage of Parts, Fuel, and Other Operating Supplies (F)

1994
- Span of Control (S)
- Community Diversion Program (M)
- Dept. of Development & Environmental Services Reduction-In-Force Process (S)
- Cedar Hills Alcohol Treatment Facility (CHAT) Accounting Procedures and Staffing Levels (M)
- DDES Fire Marshal's Office Fire Investigation Unit (S)
- DDES Accounts Receivable (F)
- Travel Expenses and Credit Card Use (M/F)
- Services & Treatment Alternatives for Developmentally Disabled Offenders Incarcerated in the King County Correctional Facility (M)
- Board of Appeals and Equalization (S)
- Surface Water Management Non-Construction CIP Costs (S)
- Tracking and Reporting on Lawsuits Involving King County (S)
- Jail Overtime Study Follow-Up (S)

1995
- Dept. of Metropolitan Services Temporary Contract Workers (M)
- King County Purchasing Practices & Supply Contract Prices (M)
- Sewage Facilities Capacity Charge (F)
- Audit Recommendation Implementation (S)
- Dept. of Metropolitan Services Professional Services Contract (M)
- Human Services Dept. Monitoring of Contract Compliance (F)
- Biomedical Waste Regulation Enforcement (S)
- Customer Service Motion Survey (S)
- County Fair Financial & Contract Management (F/M)
- Supported Employment Program (M)

1996
- Dept. of Metropolitan Services West Point & Renton Wastewater Treatment Facilities (C)
- 1990 Code Enforcement Audit Follow-Up (M)
- Dept. of Metropolitan Services Compensatory Time Policies, Procedures, and Practices (S)
- King County Women's Program (M)
- Cultural Programs (Hotel/Motel Tax Distribution) (F/M)
- Investment Management (F)
- King County Road Construction Fund and Capital Improvement Program (M)
- Emerging Infectious Diseases and Laboratory Operations (M)
- DUI Offender Program (M)
- King County Real Property Acquisition Practices (M)
- Seattle-King County Dept. of Public Health (SKCDPH) Immunization Program (M)

1997
- King County Methadone Treatment Programs (M)
- Criminal Justice-Funded Department of Public Safety Staffing (S)
- Permit Fee Waivers (M)
- Animal Control Section Collection Practices and Interlocal Services (F)
- King County Contract for Sobering Services (S)
- Office of Civil Rights Enforcement Case Management (S)
- Neighborhood Drainage Assistance Program (S)
- Surface Water Management Program (S)
- Motor Pool (S)
- Information and Telecommunications Services (M)

1998
- Automated Telephone Systems (S)
- Interlocal Agreements & Public Agency Contracts (S)
- Review of Selected Capital Project Funds (S)
- Metro Tunnel Rail Installation Process (M)
- Road Maintenance Contracts (F)
- ITS Infrastructure Operating and Maintenance Costs (F)

1999
- Information Technology Planning, Development, and Implementation Processes (M)
- East Lake Sammamish Trail (S)
- Bond Funded Capital Improvement Projects (F)
- King County Traffic Volume Forecast Model (S)
- Jail Overtime (S)
- Transit Management (C)
- Disposition of Firearms (S)
- Metro Transit Vehicle Maintenance Operations (M)
- Employee Benefits (C)
- Risk Management (C)

2000
- Audit Recommendation Implementation (S)
- Sheriff's Office Overtime (M)
- Office of Human Resources Management Hiring Practices (M)
- Columbia Public Interest Policy Institute (M)
- King County Permit Processes and Practices (M)
- School Impact Fees (S)
- Scale Operator Injury Claims (M)
- Parks Department Span of Control (S)

(M) Management Audit
(F) Financial Audit
(S) Special Study
(C) Audit/Study conducted by consultants

COMMUNICATION MATERIAL IN ALTERNATIVE FORMAT AVAILABLE UPON REQUEST; PLEASE CONTACT (206)296-1000. TDD NUMBER 296-1024